REMARKS

This amendment is submitted in response to an Office Action dated November 03, 2003. Based on this amendment, reconsideration of the merits of this patent application is respectfully requested.

The first grounds for claim rejection in the Office Action is a rejection of claims 1, 6, and 7 under 35 U.S.C. §112, second paragraph, for indefiniteness. The Examiner asserts that tit is the applicants responsibility to provide to the Examiner a sequence listing for the parent wild-type barley α-glucosidase gene. This sequence has already been presented to the U.S. Patent and Trademark office in computer readable file, and presumably entered into the PTO data base, in conjunction with the prosecution of U.S. Patent No. 5,763,252, which contains in its text the complete gene and protein sequence. The sequence rules do not require an applicant to submit sequence information already in the prior art and already in the PTO data base. Note that the specification of this prior patent was also incorporated by reference in the specification of this patent application, at the end of paragraph 0006. This rejection is not appropriate, and the applicants requests that it be reconsidered.

Claim 7 was then rejected under 35 U.S.C. §112, second paragraph, based on an objection to the use of the language "removing" for taking a residue out of the protein. This language has been changed in each instance to the language suggested by the Examiner. It is thought that this change will obviate this ground of rejection.

Claim 7 was also rejected for another informality under 35 U.S.C. §112, second paragraph based on language inconsistency between claims 6 and 7. Claim 6 has been withdrawn and claim 7 amended in a manner that, it is believed, removes any inconsistency. It is hoped that this ground of rejection is also overcome by the changes made here.

Claim 6 was rejected on several grounds including 35 U.S.C. §102 and §112. To narrow the issues under consideration here, that claim has been withdrawn.

Claim 7 was rejected under 35 U.S.C. §102(a) as being anticipated by the paper by Frandsen et al. This rejection is traversed. Frandsen does not show a modified α-glucosidase gene or protein. A brief explanation may be helpful.

In Frandsen, the paper notes that a prior gene from barley was cloned and sequenced (page 275). Note the Frandsen cites Tibbot and Skadsen on page 275, the same Skadsen and Tibbot who are the inventors of the previously mentioned Patent No. 5,763,252. The gene and protein sequence of Skadsen and Tibbot is, as noted by Frandsen, "very similar" to the gene isolated by Frandsen (page 276, first full paragraph). It is not known what the source of

the differences between the two gene sequences are. Possible explanations include errors in sequencing by one group or the other (or both), differences in allele in the barley species, the presence of more that one α-glucosidase gene in barley, or a combination of those factors. But the fact remains that Frandsen presents a native barley α-glucosidase sequence that is almost identical to the prior art of the Skadsen patent, and which is unmodified from its native form. Nothing in the protein of Frandsen has been modified. In fact, it best sequence alignment is used, as anyone of ordinary skill in the art could do, one finds that the modifications recited in claim 7 are not found in the Frandsen sequence. The Skadsen protein is presented in Fig. 6 of the Frandsen paper and is there compared with the Frandsen sequence. Note, for example that the amino acid residue for aspartate which appears as 105 of the Skadsen sequence appears at residue number 110 in the Frandsen sequence, due to new residues at positions 36, 37, 47, 54 and 55 in the Frandsen sequence that are not found in the Skadsen sequence. The applicants here explicitly used the numbering scheme of the Skansen sequence. So the aspartate corresponding to position 105 appear appears in the Frandsen sequence. Frandsen has not deleted or substituted anything from the wild-type sequence. Accordingly, Frandsen cannot anticipated any of the claims of this patent application. It is believed that this rejection was applied inappropriately and should be withdrawn.

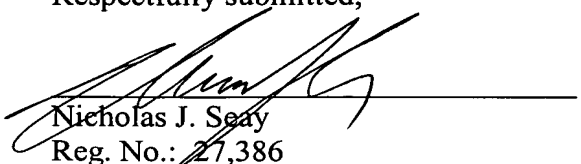
Finally, claims 1 and 7 were rejected under 35 U.S.C. §103. In summary, the Examiner argues that the wild-type gene was known, that strategies to attempt to modify proteins for thermal stability are known and that therefore the applicants results are not unexpected. The applicants disagree. This is a classic "obvious to try" type of rejection.

The art of modifying enzymes to increase their thermal stability is still a less than predictable art. While certain types of modifications to proteins are known to affect thermal stability, it is not predictable in advance which modifications will increase thermal stability for a particular enzyme without adversely affecting the catalytic function of the enzyme. Note that the art cited by the Examiner evidences this unpredictability. Li reports that some altered enzymes increase thermal stability while others destabilized the enzyme or resulted in a loss of enzyme function. Igarashi shows only one data point of a successful modification that increased thermal stability while other modifications listed on Table 1 resulted in loss of catalytic function. Thus, the prior art simply shows that certain strategies may be tried to increase thermal stability in enzymes, but one cannot predict in advance from among those potential strategies which one or ones will result in increases in stability for a particular enzyme while preserving catalytic function. This prior art simply does not provide the

reasonable expectation of success for the specific modifications recited in the claims of this patent application. For that reason, reconsideration of this rejection is requested.

Based on the foregoing, a reconsideration of this patent application and an early and favorable reply on the merits is respectfully requested.

Respectfully submitted,



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